We claim:

1. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range, the receiver including an air core having coiled therearound a wire; characterised in that the coiled wire lies on or is embedded in an outer wall of the device.

2. A device according to Claim 1 wherein the diameter of the coils of the wire is in the range 8-12mm and its length is in the range 10-20mm.

3. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range, the device including a ferrite core having coiled therearound a wire for coupling received

electromagnetic radiation to the releasable latch, characterised in that the device comprises an elongate, hollow housing, the ferrite core being elongate with its longitudinal axis aligned with the longitudinal axis of the hollow housing.

4. A device according to Claim 1, wherein the receiver includes the said ferrite core and coil.

5. A device according to Claim 3, wherein the receiver includes the said ferrite core and coil.

6. A device according to Claim 1, wherein the air core and coil are spaced from any fluid within or outside the device by a distance of 0.1mm to 1mm.

7. A device according to Claim 3, wherein the ferrite core and coil are spaced from any fluid within or outside the device by a distance of 0.1mm to 1mm.

8. A device according to Claim 1, including a transmitter having an air or ferrite core having coiled therearound a wire for transmitting electromagnetic radiation.

9. A device according to Claim 3, including a transmitter having an air or ferrite core having coiled therearound a wire for transmitting electromagnetic radiation.

10. An apparatus for transmitting electromagnetic radiation to power an ingestible device, the apparatus comprising:

a support supporting a pair of transmitter coils including one or more loops operatively connectable to a source of oscillating electrical current, the support supporting the respective coils of the pair on opposite sides of the abdomen of an animal.

11. An apparatus according to Claim 10 wherein the coils define a Helmholtz pair.

12. An apparatus according to Claim 10, wherein the loops of the pair of coils are each of generally the same radius and are spaced from one another by between one and four times the said radius.

13. An apparatus according to Claim 10, wherein the loops of the pair of coils are each of generally the same radius and are spaced from one another by between one and four times the said radius and wherein the loops are spaced from one another by twice the said radius.

14. An apparatus according to Claim 12, wherein the spacing between the loops lies in the range 400mm – 800mm.

15. An apparatus according to Claim 10 including three said coil pairs supported on the support whereby to provide three mutually skewed fields.

16. An apparatus according to Claim 15 wherein the coil pairs provide three mutually orthogonal fields.

17. An apparatus according to Claim 10 wherein the frequency of the oscillating field generated by the or each coil pair is in the range 1MHz – 14MHz.

18. An apparatus according to Claim 17 wherein the said frequency is in the range 1MHz – 3MHz.

19. An apparatus according to Claim 10 including shielding that inhibits the transmission of short wave electrostatic radiation.

20. An apparatus according to Claim 10 including shielding that inhibits the transmission of long wave radio waves.

21. An apparatus according to Claim 10 wherein the support is or includes a wearable garment.

22. An apparatus according to Claim 10 wherein the support includes a framework supporting one or more of the coil pairs, the framework permitting the abdomen of a mammal to intercept the magnetic field from the or each Helmholtz pair.

23. An apparatus according to Claim 10 wherein the support includes a framework supporting one or more of the coil pairs, the framework permitting the abdomen of a mammal to intercept the magnetic field from the or each Helmholtz pair and wherein the framework includes at least one releasably

securable member supporting a said loop, thereby permitting a mammal to enter and leave the vicinity of the or each magnetic field.

24. An apparatus according to Claim 10 wherein the spacing between the or at least one said pair of loops is adjustable.

25. An apparatus according to Claim 10 wherein the size and/or position of the field coils of the or at least one said coil pair determine the frequency of oscillation of the magnetic field generated thereby.

26. An apparatus according to Claim 10 wherein each loop of a said coil pair includes between 1 and 10 turns.

27. An apparatus according to Claim 10 wherein each loop defines at least part of the frequency determining stage of a power oscillator.

28. An apparatus according to Claim 10 wherein at least one of the said coils includes a capacitor oscillator operatively connected in parallel therewith whereby to provide a different resonant frequency, of the said coil, than that of the remainder of the coils.

29. A method of operating an ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, causing a mammal to ingest an ingestible device comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; the receiver being capable of extracting energy from an oscillating magnetic field and the method comprising:

at a chosen time, generating at least one axial, oscillating magnetic field and directing the field at the abdomen of the mammal whereby the receiver intercepts the said field and triggers the latch to cause opening of the reservoir; and

simultaneously inhibiting the generation of long wave radio waves and short wave electrostatic radiation in the vicinity of the said abdomen.

30. A method according to Claim 29 including the step of generating two or more axial, oscillating magnetic fields whose axes are mutually skewed.

31. A method according to Claim 27 including the step of generating two or more axial, oscillating magnetic fields whose axes are mutually skewed and including the step of generating three said fields, wherein the axes of the said fields are mutually orthogonal.

32. A method according to Claim 29 wherein the or each said field is generated using a coil pair operatively connected to a source of an oscillating current.

33. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator mechanism from the energy source;

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; and

a transmitter of electromagnetic radiation for transmitting a signal indicative of operation of the device,

the said reservoir including an exit aperture, for the substance, closed by a closure member that is sealingly retained relative to the aperture, the exit aperture being openable on operation of the actuator mechanism; wherein:

(i) the latch is thermally actuated;

(ii) the energy source is held in a potential energy state by the latch until the latch operates; and

(iii) the device includes a heater for heating the latch whereby, on the receiver detecting the said radiation the receiver operates to power the heater and thereby release the latch, permitting expulsion of the substance from the reservoir; characterised in that:

the device also includes a restraint operable to limit operation of the actuator

mechanism; and in that, on release of the latch, the restraint operates a switch to activate the transmitter for transmission of a said signal.

34. A device according to Claim 33 wherein:

the actuator mechanism includes a moveable member moveable under power of kinetic energy from the energy source to promote expulsion of the substance from the reservoir;

the restraint includes a flexible member interconnecting the moveable member and an anchorage fixed relative to the remainder of the device; and

the switch includes a breakable, electrically conductive member, the flexible member and the breakable member being mutually engageable whereby on movement of the moveable member sufficiently partly or completely to expel or initiate expulsion of the substance from the reservoir the flexible member engages and breaks the breakable member to operate the switch.

35. A device according to Claim 33 wherein the actuator mechanism includes a piston moveable under power from the energy source for compressing the substance in the reservoir to promote its expulsion therefrom.

36. A device according to Claim 33 wherein the transmitter includes a resonant circuit connectable to draw power from the receiver; and the breakable member is an electrical short that electrically isolates the resonant circuit from the receiver until the flexible member breaks the breakable member.

37. A device according to Claim 33 wherein the length of the flexible member is such as to limit the travel of the moveable member to a chosen maximum.

38. A device according to Claim 33 wherein the restraint and the switch are so dimensioned and/or located that the restraint operates the switch at a time corresponding to a predetermined amount of movement of the moveable member.

39. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range;

the energy source including a compressed spring capable of actring on the actuator mechanism the expansion of which is initiatable by the latch and the work of the expansion of which causes operation of the actuator mechanism, characterised in that the spring, in its uncompressed state, has a minimum helical angle of 15°.

40. A device according to Claim 39 wherein the spring includes a wire whose diameter is approximately 0.8mm.

41. A device according to Claim 39 wherein the spring defines a hollow cylinder.

42. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range;

the energy source including a compressed spring capable of acting on the actuator mechanism the expansion of which is initiatable by the latch and the work of the expansion of which causes operation of the actuator mechanism, characterised in that the spring includes a pair of wires each coiled in loops to define a pair of hollow cylinder-like shapes, a first said cylinder-like shape being of a greater internal diameter than the outer diameter of the second said cylinder-like shape and the first cylinder-like shape encircling the second cylinder.

43. A device according to Claim 42 wherein the wire of the first cylinder-like shape is looped in a clockwise direction and the wire of the second cylinder-like shape is looped in an anticlockwise direction; or *vice versa*.

44. A device according to Claim 43 wherein the wires of the first and second cylinder-like shapes are wound in the same direction.

45. A device according to Claims 42 wherein the first and second cylinder-like shapes are spaced from one another in the radial direction of the spring cross section.

46. A device according to Claim 42 wherein at least one of the wires includes a coating of an insulator over at least part of its length, whereby to insulate it from the other said wire.

47. A device according to Claim 42 wherein the ends of the wires defining each said wire are flush with the adjacent loops thereof.

48. A device according to Claim 42 wherein the compressed length of the spring is approximately ⅓ of its length in the uncompressed condition.

49. A device according to Claim 42 wherein the force applied by the spring to the actuator mechanism exceeds the maximum resistive force resisting operation of the actuator, at the time when the maximum resistive force applies.

50. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source; and

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range;

the energy source including a compressed spring the expansion of which is initiatable by the latch and the work of the expansion of which causes operation of the actuator mechanism, characterised in that the spring comprises a stack of resiliently deformable discs, the periphery of each disc having formed therein a series of waves, the waves of respective said discs connecting such that the peak of each wave contacts the trough of a wave of an adjacent said disc.

51. A device according to Claim 50 wherein the waves of each disc radiate generally

from its centre.

52. A device according to Claim 50 wherein each disc is an annulus.

53. A device according to Claim 50 wherein each disc is an annulus and wherein each annulus is about 0.25mm thick and has three said waves, the peak to trough distance of the waves being about 2mm.

54. A device according to Claim 50 wherein each disc is an annulus and wherein the spring includes 16 said annuli secured together at the respective peaks and troughs of the waves.

55. A device according to Claim 50 wherein each disc is an annulus and wherein the outer diameter of each annulus is about 8.5mm and the inner diameter is about 4.5mm.

56. A device according to any of Claims 39, 42 or 50 wherein the actuator mechanism includes a piston moveable under power from the spring for compressing the substance in the reservoir to promote its expulsion therefrom, the spring being engaged at one end directly or indirectly with the piston and secured at its other end to a member fixed relative to the remainder of the device.

57. A device according to Claim 56 wherein the spring encircles one or more further components of the device.

58. A device according to Claim 1 including a retainer for retaining moveable components within the device.

59. A device according to Claim 3 including a retainer for retaining moveable components within the device.

60. A device according to Claim 29 including a retainer for retaining moveable components within the device.

61. A device according to Claim 33 including a retainer for retaining moveable components within the device.

62. A device according to Claim 39 including a retainer for retaining moveable components within the device.

63. A device according to Claim 42 including a retainer for retaining moveable components within the device.

64. A device according to Claim 50 including a retainer for retaining moveable components within the device.

65. A device according to any of Claims 59 to 64 wherein the retainer includes a rib that reduces the cross sectional area of the hollow interior of the device in the vicinity of an opening therein.

66. A device according to Claim 56 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir.

67. A device according to Claim 56 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir and wherein the cross section of the lip tapers towards its free edge.

68. A device according to Claim 56 wherein the piston includes a flexible annular lip for slidingly sealingly engaging the interior of the reservoir and wherein the cross section of the lip is generally parallel sided.

69. An ingestible device for delivering a substance to a chosen or identifiable location in the alimentary canal of a human or animal, comprising:

an openable reservoir, for the substance, that is sealable against leakage of the substance;

an actuator mechanism for opening the reservoir;

an energy source, operatively connected for powering the actuator mechanism;

a releasable latch for controllably switching the application of power to the actuator from the energy source;

a receiver of electromagnetic radiation, for operating the latch when the receiver detects radiation within a predetermined characteristic range; and

a transmitter of electromagnetic radiation for transmitting a signal indicative of operation of the device;

the said reservoir including an exit aperture, for the substance, closed by a closure member that is sealingly retained relative to the aperture, the exit aperture being openable on operation of the actuator mechanism; wherein

(i) the latch is thermally actuated;

(ii) the energy source is held in a potential energy state by the latch until the latch operates; and

(iii) the device includes a heater for heating the latch whereby, on the receiver-detecting the said radiation the receiver operates to power the heater and thereby release

the latch, permitting expulsion of the substance from the reservoir; characterised in that the device also includes

(a) a restraint operable to limit operation of the actuator mechanism;

(b) a switch for switchably operating the transmitter; and

(c) a switch member operatively interconnecting the actuator mechanism and the switch such that operation of the actuator mechanism causes the switch member to operate the said switch.

70. A device according to Claim 69 wherein the actuator mechanism includes a moveable member and the switch member includes a lost motion arrangement whereby the moveable member moves before the switch member operates the switch.

71. A device according to Claim 69 wherein the actuator mechanism includes a moveable member and the switch member includes a lost motion arrangement whereby the moveable member moves before the switch member operates the switch and wherein the switch member interconnects the moveable member and the switch; and includes a slack, flexible member the slackness of which provides the said lost motion arrangement.

72. A device according to Claim 69 wherein the actuator mechanism includes a moveable member and the switch member includes a lost motion arrangement whereby the moveable member moves before the switch member operates the switch and wherein the switch member interconnects the moveable member and the switch; and includes a slack, flexible member the slackness of which provides the said lost motion arrangement, the device including a pcb having a breakable wire secured at spaced locations thereon to define the switch, the pcb being perforated and the said switch and the said moveable member lying respectively at opposite sides of the pcb; and the switch member including a slack, flexible filament that passes through a perforation in the pcb and including a loop that encloses the breakable wire, the filament being secured to the moveable member whereby when the moveable member moves the filament tightens such that the loop breaks the breakable wire.

73. A device according to Claim 69 including a pcb supporting the receiver and the transmitter, the receiver and the transmitter each including a resistor track secured on the pcb, the resistor tracks of the transmitter and receiver lying respectively on opposite sides of the pcb.

74. A device according to Claim 69 including a pcb supporting the receiver and the transmitter, the receiver and the transmitter each including a resistor track secured on the pcb, the resistor tracks of the transmitter and receiver lying respectively on opposite sides of the pcb and wherein the pcb includes one or more perforations in the vicinity of each said resistor track.

75. A device according to Claim 69 wherein the actuator mechanism includes a moveable member and the switch member includes a lost motion arrangement whereby the moveable member moves before the switch member operates the switch and wherein the switch member interconnects the moveable member and the switch; and includes a slack, flexible member the slackness of which provides the said lost motion arrangement, the device including a pcb having a breakable wire secured at spaced locations thereon to define the switch, the pcb being perforated and the said switch and the said moveable member lying respectively at opposite sides of the pcb; and the switch member including a slack, flexible filament that passes through a perforation in the pcb and including a loop that encloses the breakable wire, the filament being secured to the moveable member whereby when the moveable member moves the filament tightens such that the loop breaks the breakable wire; wherein a projection protrudes from an edge of a perforation through the pcb; and wherein the latch includes a sharp melting point filament interconnecting the actuator member and the said projection.

76. A device according to Claim 75 wherein the heater is secured to the projection in heat transmitting proximity to the sharp melting point filament.

77. A device according to any of Claims 1, 3, 29, 33, 39, 42, 50 or 69 the reservoir of which includes a charge of liquid, powdered or solid substance or a suspension or solution for discharge into the GI tract of a mammal.

78. A device according to any of Claims 1, 3, 29, 33, 39, 42, 50 or 69, including a radioisotope tag generating radiation that is detectable for indicating the location of the device in the GI tract of a mammal.

79. A method according to Claim 29, including the step of indicating the location of the device in the GI tract of the mammal, using a radioisotope tag.

80. A method according to Claim 29, including the step of indicating the location of the device in the GI tract of the mammal, using a radioisotope tag and wherein the step of

indicating the location includes using Gamma scintigraphy to indicate the location of the device in the said GI tract.